DOCUMENT RESUME

ED 307 504 CE 052 633

AUTHOR Mukai, Masaaki; Kobayashi, Ryozo
TITLE TV Trouble-Shooting Manual. Volumes 15-16. Part 7: Power-Supply Circuit. Student and Instructor's Manuals.
INSTITUTION International Labour Office, Islamabad (Pakistan). Asian and Pacific Skill Development Programme.
REPORT NO ISBN-92-2-106826-9; ISBN-92-2-106827-7
PUB DATE 88
NOTE 26p.; For related manuals, see CE 052 625-632.
AVAILABLE FROM ILO Publications, International Labour Office, CH-1211 Geneva 22, Switzerland ($2.00 each volume; complete set: ISBN-92-2-106780-7).
PUB TYPE Guides - Classroom Use - Materials (For Learner) (051) -- Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Adult Vocational Education; *Electric Circuits; *Equipment Maintenance; Postsecondary Education; *Repair; *Television Radio Repairers; *Video Equipment
IDENTIFIERS *Troubleshooting

ABSTRACT

These volumes are, respectively, the self-instructional student manual and the teacher manual that cover the seventh set of training topics in this course for television repair technicians. Both contain identical information on the television power supply circuit, including sections on the rectifier circuit and the voltage regulator circuit. Functional block diagrams and circuit diagrams are included. (CML)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED307504

TV TROUBLE-SHOOTING MANUAL
VOLUMES 15-16

Part 7: Power-Supply Circuit

Student and Instructor's Manuals

Asian and Pacific Skill Development Programme
Islamabad, Pakistan

CE052633

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

✓ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

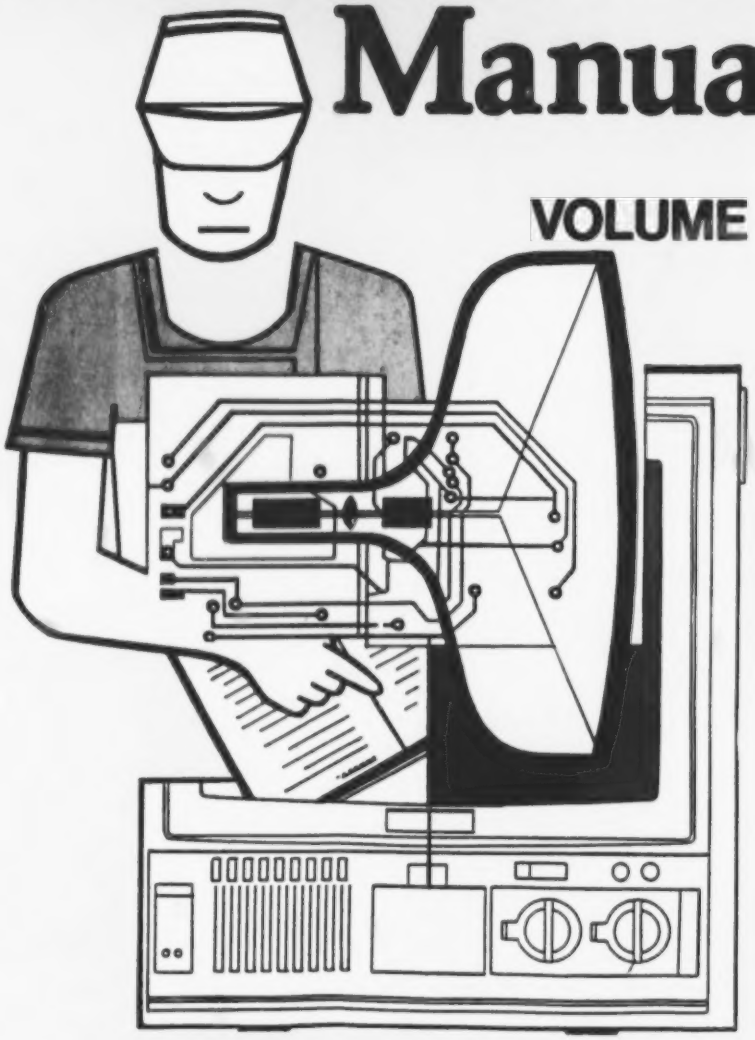
"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

TV Trouble-shooting Manual

VOLUME



BY MASAAKI MUKAI AND RYOZO KOBAYASHI

TV Trouble-shooting Manual

VOLUME 15

BY MASAAKI MUKAI AND RYOZO KOBAYASHI

Part 7: Power-supply circuit

ASIAN AND PACIFIC SKILL DEVELOPMENT PROGRAMME
INTERNATIONAL LABOUR OFFICE
ISLAMABAD, PAKISTAN, 1988

Copyright © International Labour Organisation 1988

Publications of the International Labour Office enjoy copyright under Protocol 2 of the Universal Copyright Convention. Nevertheless, short excerpts from them may be reproduced without authorisation, on condition that the source is indicated. For rights of reproduction or translation, application should be made to the Publications Branch (Rights and Permission), International Labour Office, CH-1211 Geneva 22, Switzerland. The International Labour Office welcomes such applications.

ISBN for the complete set: 92-2-106780-7
ISBN for this volume: 92-2-106826-9

First published 1988

Designed by West Design Studio, Manila

The designations employed in ILO publications, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever by the International Labour Office concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

The responsibility for opinions expressed in signed articles, studies and other contributions rests solely with their authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in them.

Reference to names of firms and commercial products and processes does not imply their endorsement by the International Labour Office, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.

ILO publications can be obtained through major booksellers or ILO local offices in many countries, or direct from ILO Publications, International Labour Office, CH-1211 Geneva 22, Switzerland. A catalogue or list of new publications will be sent free of charge from the above address.

Printed by Pictorial Printers Ltd., Islamabad, Pakistan

Contents

Part 7: Power-supply circuit

Power-supply circuit 1
Rectifier circuit 2
Voltage regulator circuit 3

Part 7: Power-supply circuit

Power-supply circuit

There are two kinds of power supply used in a TV receiver circuit: a DC power supply that converts the AC line to a DC voltage and a high-voltage power supply that rectifies the pulses produced in the horizontal deflection circuit. The second kind has been discussed earlier. This chapter will deal with the first kind.

The voltage regulator circuit is used in the DC power supply for receivers. This circuit provides a practically constant DC output voltage despite variations (within tolerable values) in the input voltage and the load current. Figure 7-1 shows a functional block diagram of a DC power-supply circuit. This circuit uses no isolation or power transformer.

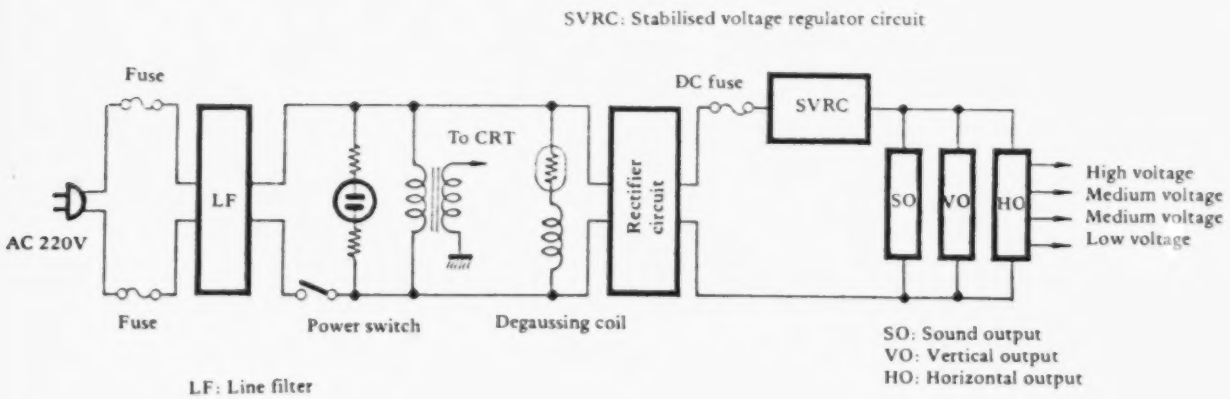


Figure 7-1
Functional block diagram of a power-supply circuit

Rectifier circuit

A full-wave rectifier circuit converts an AC into a DC voltage during the entire cycle. Figure 7-2 shows a full-wave rectifier circuit. The diodes are connected to form a bridge rectifier circuit. A line filter and a demagnetising circuit are installed before the rectifier circuit.

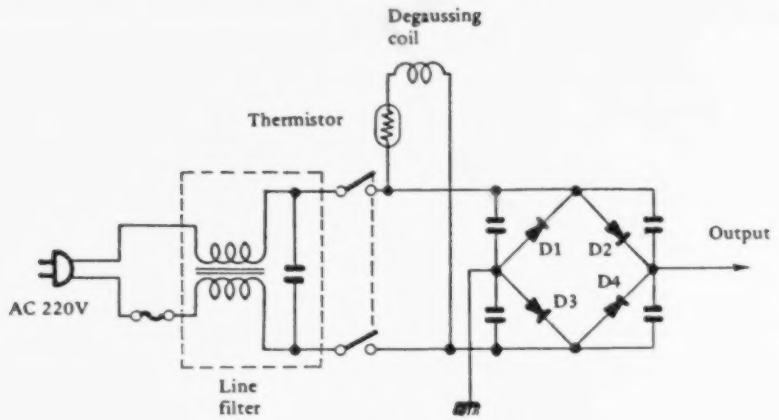


Figure 7-2
A rectifier circuit

Figure 7-3 shows how the full-wave bridge rectifier circuit operates. D2 and D3 conduct during the positive cycles of the input AC voltage. The current flow during this period is indicated by the solid curve. During the negative cycles, D4 and D1 conduct. The dashed curve indicates the current flow during this period. Note that during the entire AC cycle, the direction of the current through the load is the same.

As mentioned above, a full-wave rectifier circuit converts an AC into a DC voltage during the entire cycle. A rectifier circuit which converts an AC signal during half-cycles is called a half-wave rectifier circuit.

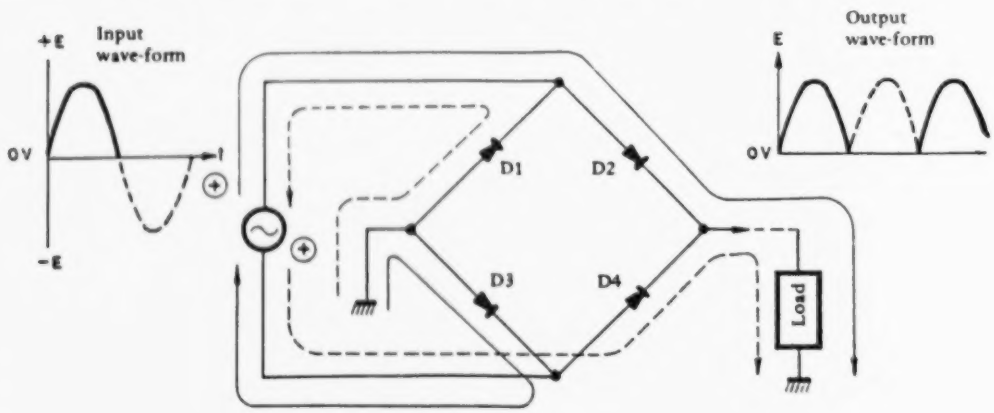


Figure 7-3
Functional circuit diagram of a full-wave bridge rectifier circuit

Voltage regulator circuit

The voltage regulator circuit stabilises the output voltage of the power-supply circuit despite changes in the input voltage and the load current. Besides supplying a DC voltage, the circuit reduces the ripples in the output voltage.

The voltage regulator circuit can be divided into two major groups: the SCR (silicon-controlled rectifier) regulator and the transistor regulator.

The transistor regulator is connected in series with the load. The internal resistance of the voltage regulator circuit is controlled by the change in output voltage to restore the proper output voltage. The SCR regulator keeps the output voltage constant by controlling the conduction period (switching) of the SCR.

The SCR regulator is more power-efficient than the transistor regulator. But the transistor regulator provides a better output stability. The transistor voltage regulator circuits are more commonly used.

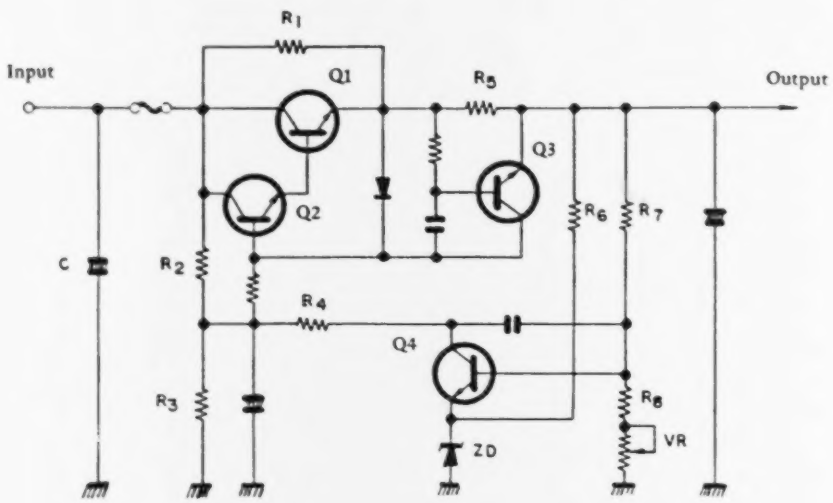


Figure 7-4
A voltage regulator circuit by transistors

Transistor voltage regulator circuit

Figure 7-4 shows a transistor voltage regulator circuit. The rectified AC current shown in Figure 7-3 is supplied to the input and filtered by capacitor C. The peak of this pulsating DC voltage is 311V (220 x SQR[2]) without load.

In the circuit shown in Figure 7-4, Q1 functions as the output voltage regulator transistor. This is usually a power transistor with a high current capacity. In big colour TV sets, two parallel transistors are used.

Q2 functions as the voltage-control transistor. A change in its base current also changes the base current of Q1. Thus Q2 controls the emitter current of Q1.

Q3 protects Q1 from a short circuit in the load. When the load current increases too much, the voltage drop across R5 biases Q3 into conduction. Thus

the base voltage of Q2 decreases and Q1 is driven to cut off, producing a high voltage across the emitter and the collector of Q1. With resistor R1 parallel to Q1, Q1 is shunted and thus protected.

Q4 serves as an error-detector transistor. The base voltage is supplied by the voltage divider circuit consisting of R7, R8 and VR. On the other hand, a zener diode ZD is connected to the emitter of Q4. Resistor R6 biases ZD in the breakdown region. The zener supplies a constant emitter voltage to Q4. The zener voltage also serves as a reference voltage. Changes in the base voltage of Q4 (output voltage) vary only the collector voltage of Q4. Changes in the collector voltage vary the current flow through R2, controlling the base voltage of Q2.

When the output voltage decreases, the current flow through R7, R8 and VR drops, lessening the base voltage of Q4. When the base voltage of Q4 decreases, its collector current and consequently the current flow through R2 and R4 decreases, lessening the voltage drop across R2. When the voltage drop across R2 decreases, the base voltage of Q2 increases, raising its emitter current, which is also the base current of Q1. When the base current of Q1 increases, its internal resistance decreases. Since Q1 is in series with the load, the output voltage increases. This compensates for the initial decrease in the output voltage. Therefore the circuit functions as an output voltage regulator circuit.

On the other hand, when the output voltage increases, the base voltage of Q4 increases, raising its collector current. When the collector current of Q4 increases, the current through R2, as well as the voltage drop across it, increases. This decreases the base voltage of Q2 and its emitter current. Since the emitter current of Q2 is also the base current of Q1, the current through Q1 decreases. This increases the internal resistance of Q1. The output voltage decreases and this compensates for the initial increase in the output voltage.

Thus the internal resistance of the voltage regulator circuit controls and maintains the level of the output voltage.

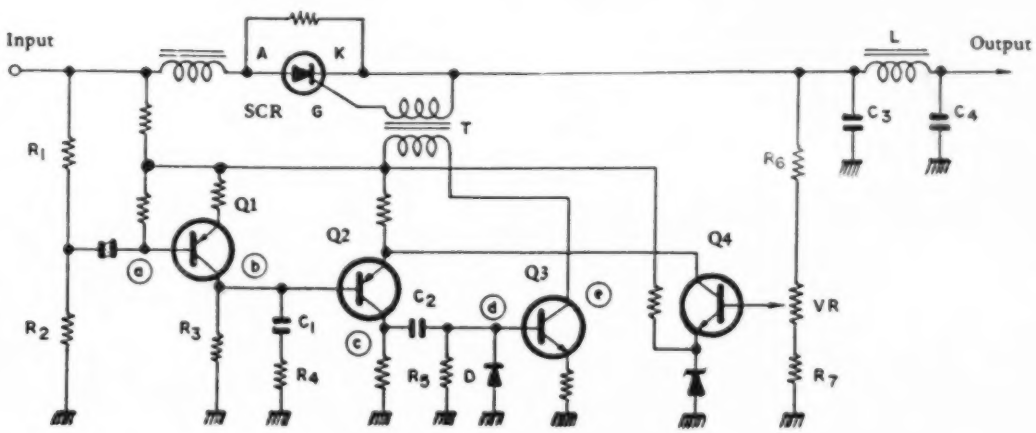


Figure 7-5
A voltage regulator circuit by an SCR

SCR voltage regulator circuit

Figure 7-5 shows an SCR voltage regulator circuit. The full-wave rectified AC voltage is supplied to the input of the circuit. The current controlled by the SCR is removed by the filter circuit of L, C3 and C4.

The SCR has three electrodes: the anode (A), the cathode (K) and the gate (G). The direction of the current flow is from the anode to the cathode. Current flows only when the SCR is forward-biased and a positive trigger signal is supplied to the gate.

The positive trigger signal is needed to overcome the gate-cathode junction barrier voltage to allow the SCR to conduct. When conducting, the SCR continues to do so even if the trigger signal is no longer supplied to the gate. Thus the gate functions as a latching switch that triggers the SCR into conduction. The conduction stops when the anode voltage becomes equal to or less than the cathode voltage.

In Figure 7-6 the positive pulses supplied to the gate triggers on the SCR. The capacitor C is charged by the full-wave rectifier AC voltage supplied to the anode. When C is fully charged, the current flow through the SCR becomes zero and cuts off the SCR. When the SCR is cut off, the capacitor discharges through the load. The SCR remains cut off until the next positive pulse even if the anode-cathode junction is forward-biased. When the next pulse is applied to the gate, the SCR conducts and the capacitor is charged again.

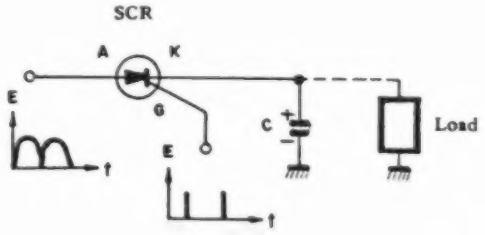


Figure 7-6
Principle of an SCR operation

The operation of the SCR regulator circuit in Figure 7-5 will be explained using Figure 7-7.

The full-wave rectified AC voltage is supplied to the base of Q1 by the divider network formed by R1 and R2. Q1 conducts during the period of the shaded portion of the signal, as shown in Figure 7-7(1). The signal at the collector of Q1 is a pulse signal, as shown in (2). This pulse signal charges C1. During the cut-off period of Q1, C1 discharges through R3 and R4. This produces a sawtooth wave, as shown in (3), across R3. This sawtooth signal is applied to the base of Q2.

The error-detector transistor Q4 is connected to the emitter of Q2. A change in the output voltage of the regulator circuit varies the collector voltage of Q4. Its emitter voltage is kept constant by a zener diode in the emitter. The

collector voltage of Q4 is supplied to the emitter of Q2 to control the bias of Q2. Changes in the bias of Q2 vary the conduction period of Q2. Q2 is triggered on at an earlier period (or at the higher level) of the sawtooth signal supplied to its base when its emitter voltage is greater. The level of the sawtooth signal where Q2 conducts is shown by (31). For this case, the resulting collector signal of Q2 is shown by the curve in (41). (311) shows the level of the sawtooth signal where Q2 conducts when its emitter voltage is lower. The curve in (411) is the resulting collector signal of Q2.

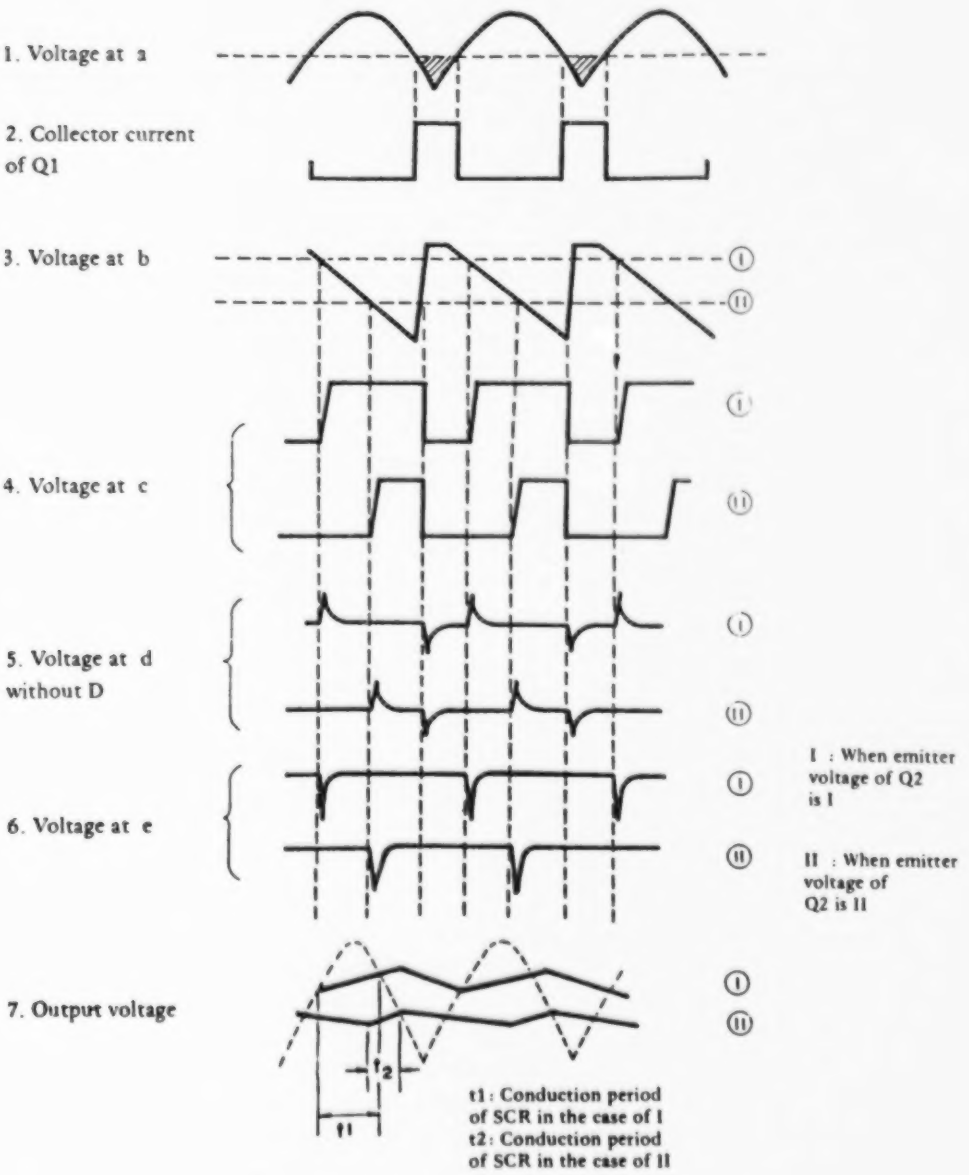

1. Voltage at a
2. Collector current of Q1
3. Voltage at b
4. Voltage at c
5. Voltage at d without D
6. Voltage at e
7. Output voltage
I
II
I : When emitter voltage of Q2 is I
II : When emitter voltage of Q2 is II
t2
t1
t1 : Conduction period of SCR in the case of I
t2 : Conduction period of SCR in the case of II

Figure 7-7
Functional wave-forms of the circuit diagram shown in Figure 7-5

In any case, the collector signal of Q2 is changed by the differentiator formed by C2 and R5. The resulting wave-form is shown in (5). The differentiated signal is supplied to Q3. Diode D shorts the negative pulses of the signal. Thus Q3 amplifies only the positive pulses. The output of Q3 is negative because Q3 operates as an inverter amplifier. The output wave-form is shown in (6). These negative pulses are supplied to the primary of the transformer. Positive pulses are taken from the secondary. These positive pulses are used to trigger the SCR. The conduction period of the SCR is longer (71) or shorter (711), if the pulse signals supplied to the transformer are the signals shown in (61) or (611), respectively. The longer the conduction period of the SCR, the higher the output voltage; the shorter the conduction period, the lower the output voltage.

Note that if the regulator output voltage decreases, the voltage sampled by Q4 decreases. When the base voltage of Q4 decreases, its collector voltage increases. Since the collector of Q4 is connected to the emitter of Q2, the emitter voltage of Q2 also increases. When the emitter voltage of Q2 is higher, the waveform shown in (61) is supplied to the transformer. The conduction period of the SCR becomes longer. This increases the output voltage of the regulator circuit. Thus the output voltage of the regulator is kept constant.

Similarly, if the output voltage of the regulator increases, the conduction period of the SCR becomes shorter. This decreases the output voltage of the regulator. Again the output is stabilised.

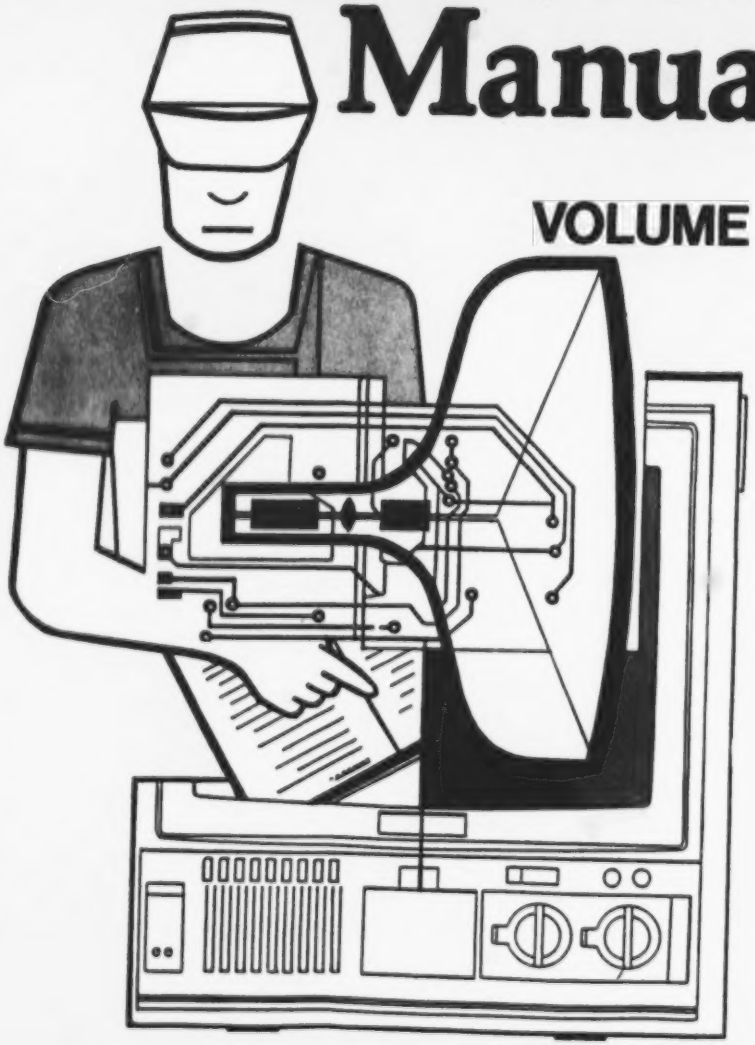
As shown in (7), the output voltage of the SCR contains ripples or AC components. The filter circuit formed by L, C3 and C4 is included at the output to minimise the ripples.

ASIAN AND
PACIFIC SKILL
DEVELOPMENT
PROGRAMME
INTERNATIONAL
LABOUR
ORGANISATION
P.O. BOX 1423
ISLAMABAD,
PAKISTAN

ISBN for the complete set: 92-2-106780-7
ISBN for this volume: 92-2-106826-9
Price US$ 2.00

TV Trouble-shooting Manual

VOLUME



BY MASAAKI MUKAI AND RYOZO KOBAYASHI

TV Trouble-shooting Manual

VOLUME 16

BY MASAAKI MUKAI AND RYOZO KOBAYASHI

Part 7: Power-supply circuit (Instructor's manual)

ASIAN AND PACIFIC SKILL DEVELOPMENT PROGRAMME
INTERNATIONAL LABOUR OFFICE
ISLAMABAD, PAKISTAN, 1988

Copyright © International Labour Organisation 1988

Publications of the International Labour Office enjoy copyright under Protocol 2 of the Universal Copyright Convention. Nevertheless, short excerpts from them may be reproduced without authorisation, on condition that the source is indicated. For rights of reproduction or translation, application should be made to the Publications Branch (Rights and Permission), International Labour Office, CH-1211 Geneval 22, Switzerland. The International Labour Office welcomes such applications.

ISBN for the complete set: 92-2-106780-7
ISBN for this volume: 92-2-106827-7

First published 1988

Designed by West Design Studio, Manila

The designations employed in ILO publications, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever by the International Labour Office concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

The responsibility for opinions expressed in signed articles, studies and other contributions rests solely with their authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in them.

Reference to names of firms and commercial products and processes does not imply their endorsement by the International Labour Office, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.

ILO publications can be obtained through major booksellers or ILO local offices in many countries, or direct from ILO Publications, International Labour Office, CH-1211 Geneva 22 Switzerland. A catalogue or list of new publications will be sent free of charge from the above address.

Printed by Pictorial Printers Ltd., Islamabad, Pakistan

Contents

Part 7: Power-supply circuit

Power-supply circuit 1
Rectifier circuit 2
Voltage regulator circuit 3

Part 7: Power-supply circuit

Power-supply circuit

There are two kinds of power supply used in a TV receiver circuit: a DC power supply that converts the AC line to a DC voltage and a high-voltage power supply that rectifies the pulses produced in the horizontal deflection circuit. The second kind has been discussed earlier. This chapter will deal with the first kind.

The voltage regulator circuit is used in the DC power supply for receivers. This circuit provides a practically constant DC output voltage despite variations (within tolerable values) in the input voltage and the load current. Figure 7-1 shows a functional block diagram of a DC power-supply circuit. This circuit uses no isolation or power transformer.

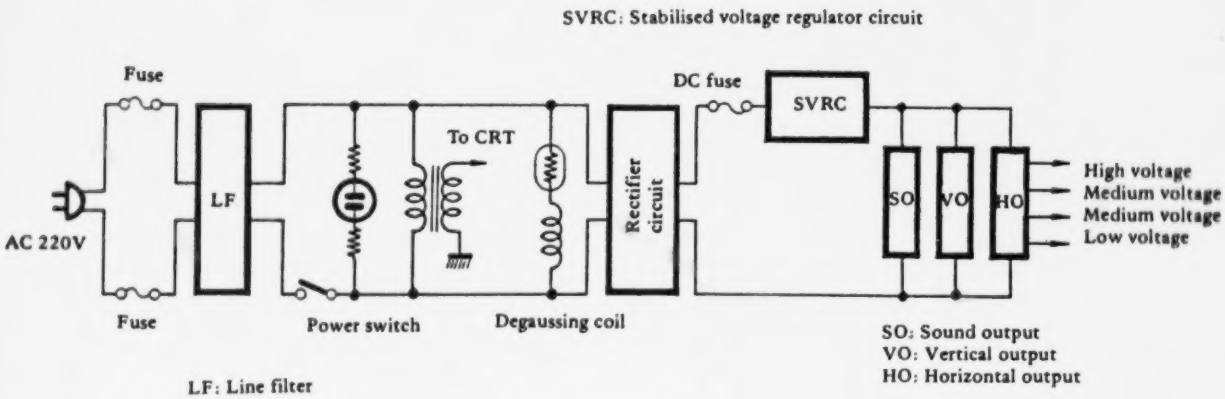


Figure 7-1
Functional block diagram of a power-supply circuit

Rectifier circuit

A full-wave rectifier circuit converts an AC into a DC voltage during the entire cycle. Figure 7-2 shows a full-wave rectifier circuit. The diodes are connected to form a bridge rectifier circuit. A line filter and a demagnetising circuit are installed before the rectifier circuit.

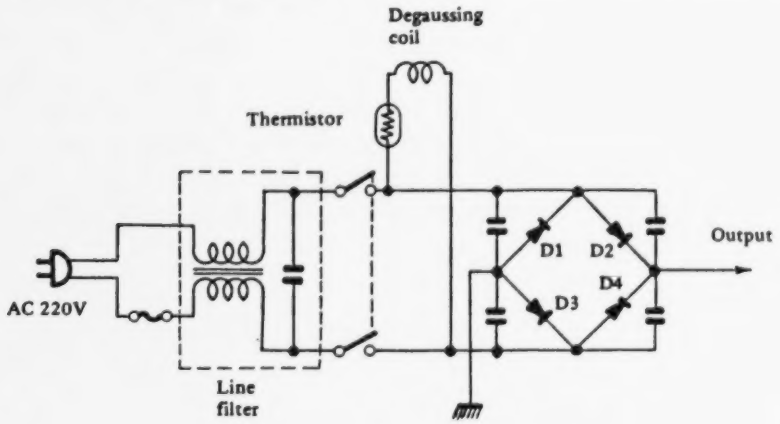


Figure 7-2
A rectifier circuit

Figure 7-3 shows how the full-wave bridge rectifier circuit operates. D2 and D3 conduct during the positive cycles of the input AC voltage. The current flow during this period is indicated by the solid curve. During the negative cycles, D4 and D1 conduct. The dashed curve indicates the current flow during this period. Note that during the entire AC cycle, the direction of the current through the load is the same.

As mentioned above, a full-wave rectifier circuit converts an AC into a DC voltage during the entire cycle. A rectifier circuit which converts an AC signal during half-cycles is called a half-wave rectifier circuit.

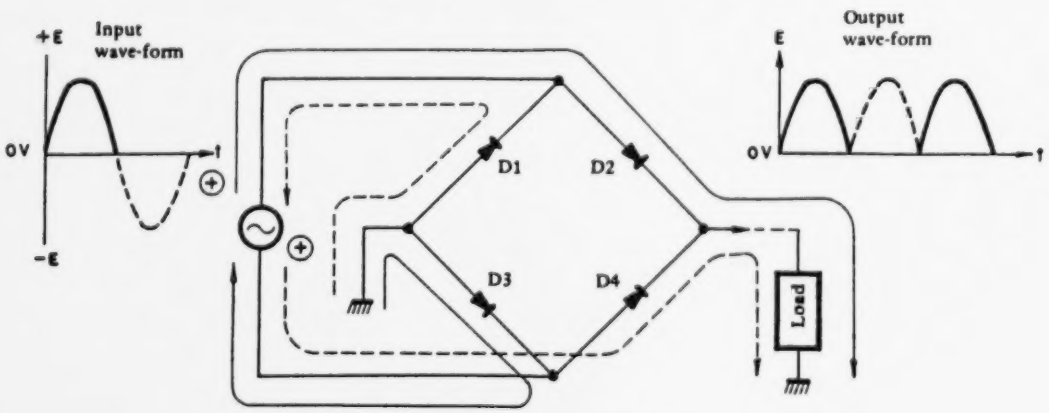


Figure 7-3
Functional circuit diagram of a full-wave bridge rectifier circuit

Voltage regulator circuit

The voltage regulator circuit stabilises the output voltage of the power-supply circuit despite changes in the input voltage and the load current. Besides supplying a DC voltage, the circuit reduces the ripples in the output voltage.

The voltage regulator circuit can be divided into two major groups: the SCR (silicon-controlled rectifier) regulator and the transistor regulator.

The transistor regulator is connected in series with the load. The internal resistance of the voltage regulator circuit is controlled by the change in output voltage to restore the proper output voltage. The SCR regulator keeps the output voltage constant by controlling the conduction period (switching) of the SCR.

The SCR regulator is more power-efficient than the transistor regulator. But the transistor regulator provides a better output stability. The transistor voltage regulator circuits are more commonly used.

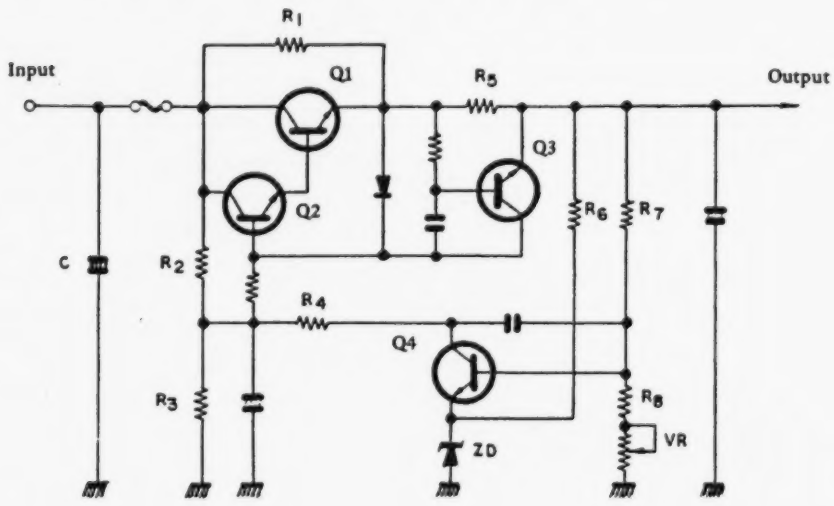


Figure 7-4
A voltage regulator circuit by transistors

Transistor voltage regulator circuit

Figure 7-4 shows a transistor voltage regulator circuit. The rectified AC current shown in Figure 7-3 is supplied to the input and filtered by capacitor C. The peak of this pulsating DC voltage is 311V (220 x SQR[2]) without load.

In the circuit shown in Figure 7-4, Q1 functions as the output voltage regulator transistor. This is usually a power transistor with a high current capacity. In big colour TV sets, two parallel transistors are used.

Q2 functions as the voltage-control transistor. A change in its base current also changes the base current of Q1. Thus Q2 controls the emitter current of Q1.

Q3 protects Q1 from a short circuit in the load. When the load current increases too much, the voltage drop across R5 biases Q3 into conduction. Thus

the base voltage of Q2 decreases and Q1 is driven to cut off, producing a high voltage across the emitter and the collector of Q1. With resistor R1 parallel to Q1, Q1 is shunted and thus protected.

Q4 serves as an error-detector transistor. The base voltage is supplied by the voltage divider circuit consisting of R7, R8 and VR. On the other hand, a zener diode ZD is connected to the emitter of Q4. Resistor R6 biases ZD in the breakdown region. The zener supplies a constant emitter voltage to Q4. The zener voltage also serves as a reference voltage. Changes in the base voltage of Q4 (output voltage) vary only the collector voltage of Q4. Changes in the collector voltage vary the current flow through R2, controlling the base voltage of Q2.

When the output voltage decreases, the current flow through R7, R8 and VR drops, lessening the base voltage of Q4. When the base voltage of Q4 decreases, its collector current and consequently the current flow through R2 and R4 decreases, lessening the voltage drop across R2. When the voltage drop across R2 decreases, the base voltage of Q2 increases, raising its emitter current, which is also the base current of Q1. When the base current of Q1 increases, its internal resistance decreases. Since Q1 is in series with the load, the output voltage increases. This compensates for the initial decrease in the output voltage. Therefore the circuit functions as an output voltage regulator circuit.

On the other hand, when the output voltage increases, the base voltage of Q4 increases, raising its collector current. When the collector current of Q4 increases, the current through R2, as well as the voltage drop across it, increases. This decreases the base voltage of Q2 and its emitter current. Since the emitter current of Q2 is also the base current of Q1, the current through Q1 decreases. This increases the internal resistance of Q1. The output voltage decreases and this compensates for the initial increase in the output voltage.

Thus the internal resistance of the voltage regulator circuit controls and maintains the level of the output voltage.

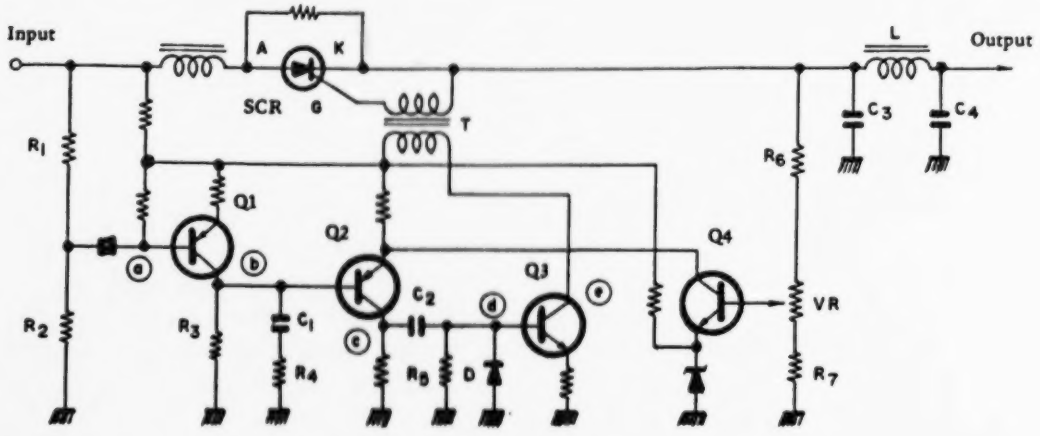


Figure 7-5
A voltage regulator circuit by an SCR

SCR voltage regulator circuit

Figure 7-5 shows an SCR voltage regulator circuit. The full-wave rectified AC voltage is supplied to the input of the circuit. The current controlled by the SCR is removed by the filter circuit of L, C3 and C4.

The SCR has three electrodes: the anode (A), the cathode (K) and the gate (G). The direction of the current flow is from the anode to the cathode. Current flows only when the SCR is forward-biased and a positive trigger signal is supplied to the gate.

The positive trigger signal is needed to overcome the gate-cathode junction barrier voltage to allow the SCR to conduct. When conducting, the SCR continues to do so even if the trigger signal is no longer supplied to the gate. Thus the gate functions as a latching switch that triggers the SCR into conduction. The conduction stops when the anode voltage becomes equal to or less than the cathode voltage.

In Figure 7-6 the positive pulses supplied to the gate triggers on the SCR. The capacitor C is charged by the full-wave rectifier AC voltage supplied to the anode. When C is fully charged, the current flow through the SCR becomes zero and cuts off the SCR. When the SCR is cut off, the capacitor discharges through the load. The SCR remains cut off until the next positive pulse even if the anode-cathode junction is forward-biased. When the next pulse is applied to the gate, the SCR conducts and the capacitor is charged again.

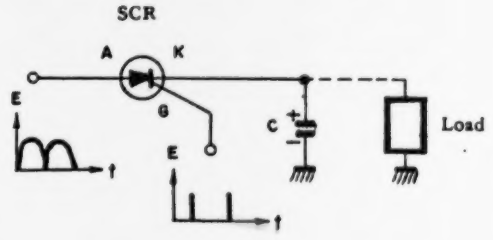


Figure 7-6
Principle of an SCR operation

The operation of the SCR regulator circuit in Figure 7-5 will be explained using Figure 7-7.

The full-wave rectified AC voltage is supplied to the base of Q1 by the divider network formed by R1 and R2. Q1 conducts during the period of the shaded portion of the signal, as shown in Figure 7-7(1). The signal at the collector of Q1 is a pulse signal, as shown in (2). This pulse signal charges C1. During the cut-off period of Q1, C1 discharges through R3 and R4. This produces a sawtooth wave, as shown in (3), across R3. This sawtooth signal is applied to the base of Q2.

The error-detector transistor Q4 is connected to the emitter of Q2. A change in the output voltage of the regulator circuit varies the collector voltage of Q4. Its emitter voltage is kept constant by a zener diode in the emitter. The collector voltage of Q4 is supplied to the emitter of Q2 to control the bias of

Q2. Changes in the bias of Q2 vary the conduction period of Q2. Q2 is triggered on at an earlier period (or at the higher level) of the sawtooth signal supplied to its base when its emitter voltage is greater. The level of the sawtooth signal where Q2 conducts is shown by (3I). For this case, the resulting collector signal of Q2 is shown by the curve in (4I). (3II) shows the level of the sawtooth signal where Q2 conducts when its emitter voltage is lower. The curve in (4II) is the resulting collector signal of Q2.

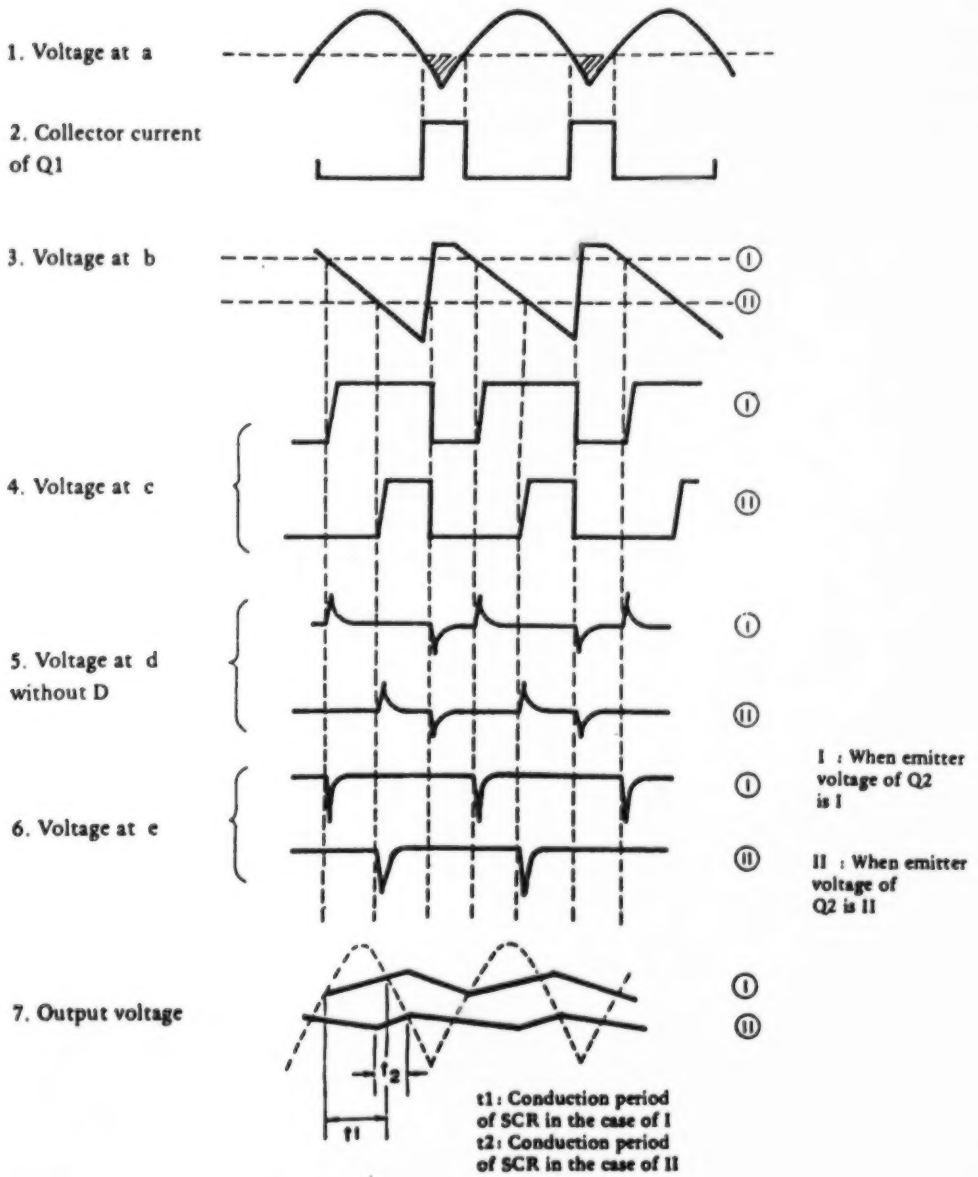

1. Voltage at a
2. Collector current of Q1
3. Voltage at b
4. Voltage at c
5. Voltage at d without D
6. Voltage at e
7. Output voltage
I
II
I : When emitter voltage of Q2 is I
II : When emitter voltage of Q2 is II
t2
t1
t1 : Conduction period of SCR in the case of I
t2 : Conduction period of SCR in the case of II

Figure 7-7
Functional wave-forms of the circuit diagram shown in Figure 7-5

In any case, the collector signal of Q2 is changed by the differentiator formed by C2 and R5. The resulting wave-form is shown in (5). The differentiated signal is supplied to Q3. Diode D shorts the negative pulses of the signal. Thus Q3 amplifies only the positive pulses. The output of Q3 is negative because Q3 operates as an inverter amplifier. The output wave-form is shown in (6). These negative pulses are supplied to the primary of the transformer. Positive pulses are taken from the secondary. These positive pulses are used to trigger the SCR. The conduction period of the SCR is longer (7I) or shorter (7II), if the pulse signals supplied to the transformer are the signals shown in (6I) or (6II), respectively. The longer the conduction period of the SCR, the higher the output voltage; the shorter the conduction period, the lower the output voltage.

Note that if the regulator output voltage decreases, the voltage sampled by Q4 decreases. When the base voltage of Q4 decreases, its collector voltage increases. Since the collector of Q4 is connected to the emitter of Q2, the emitter voltage of Q2 also increases. When the emitter voltage of Q2 is higher, the wave-form shown in (6I) is supplied to the transformer. The conduction period of the SCR becomes longer. This increases the output voltage of the regulator circuit. Thus the output voltage of the regulator is kept constant.

Similarly, if the output voltage of the regulator increases, the conduction period of the SCR becomes shorter. This decreases the output voltage of the regulator. Again the output is stabilised.

As shown in (7), the output voltage of the SCR contains ripples or AC components. The filter circuit formed by L, C3 and C4 is included at the output to minimise the ripples.

ASIAN AND
PACIFIC SKILL
DEVELOPMENT
PROGRAMME
INTERNATIONAL
LABOUR
ORGANISATION
P.O. BOX 1423
ISLAMABAD,
PAKISTAN

ISBN for the complete set: 92-2-106780-7
ISBN for this volume: 92-2-106827-7
Price US$ 2.00